

## CLAIMS

1. An air-core coil comprising unit coil portions each having at least one conductor wound into a spiral form, the unit coil portions being arranged repeatedly axially of the coil, each of the unit coil portions comprising a plurality of unit turn portions which are different from each other in inner peripheral length, the unit turn portions of small inner peripheral length being at least partly forced inwardly of the unit turn portions of great inner peripheral length.

2. An air-core coil according to claim 1 wherein the plurality of unit turn portions providing each of the unit coil portions are sequentially wound from an inner peripheral side to an outer peripheral side, or from the outer peripheral side to the inner peripheral side, one unit turn portion on an outermost periphery or on an innermost periphery being connected to another unit turn portion on an outermost periphery or on an innermost periphery of the adjacent unit coil portion.

3. An air-core coil wherein a plurality of unit turn portions which are different from each other in inner peripheral length are consecutively formed axially of the coil, unit coil portions comprising the unit turn portions being repeatedly formed axially of the coil, by winding at

least one conductor into a spiral form, to produce a partly finished air-core coil, and thereafter the partly finished coil is compressed axially of the coil to thereby force the unit turn portion of small inner peripheral length at least partly inwardly of the unit turn portion of great inner peripheral length from among the unit turn portions providing each of the unit coil portions, whereby each of the unit coil portions is made at least partly multi-layered.

4. A coil device comprising an air-core coil fitted around a core or a bobbin, the air core coil comprising unit coil portions each having at least one conductor wound into a spiral form, the unit coil portions being arranged repeatedly axially of the coil, each of the unit coil portions comprising a plurality of unit turn portions which are different from each other in inner peripheral length, and the unit turn portions of small inner peripheral length being at least partly forced inwardly of the unit turn portions of great inner peripheral length.

5. A coil device according to claim 4 wherein the air-core coil includes the plurality of unit turn portions providing each of the unit coil portions, the unit turn portions being sequentially wound from an inner peripheral side to an outer peripheral side, or from the outer peripheral side to the inner peripheral side, one unit turn

portion on an outermost periphery or on an innermost periphery being connected to another unit turn portion on an outermost periphery or on an innermost periphery of the adjacent unit coil portion.

5           6. A coil device comprising an air-core coil fitted around a core or a bobbin, the air core coil wherein a plurality of unit turn portions which are different from each other in inner peripheral length are consecutively formed axially of the coil, unit coil portions comprising the unit  
10 turn portions being repeatedly formed axially of the coil, by winding at least one conductor into a spiral form, to produce a partly finished air-core coil, and thereafter the partly finished coil is compressed axially of the coil to thereby force the unit turn portion of small inner peripheral length  
15 at least partly inwardly of the unit turn portion of great inner peripheral length from among the unit turn portions providing each of the unit coil portions, whereby each of the unit coil portions is made at least partly multi-layered.

          7. A process for fabricating an air-core coil comprising  
20 winding at least one conductor into a spiral form to thereby form, axially of the coil, consecutively a plurality of unit turn portions which are different from each other in inner peripheral length and to repeatedly form, axially of the coil, unit coil portions comprising the unit turn portions to

thereby produce a partly finished air-core coil, and compressing, axially of the coil, the partly finished coil to thereby force the unit turn portions of small inner peripheral length at least partly inwardly of the unit turn portions of great inner peripheral length from among the unit turn portions providing each of the unit coil portions, thereby making each of the unit coil portions at least partly multi-layered.

8. A process for fabricating an air-core coil according to claim 7 wherein the partly finished coil is fabricated by winding the conductor around an outer peripheral surface of a wire wiring jig, the wire wiring jig comprising a plurality of winding cores arranged axially of the coil, each pair of the adjacent winding cores being different from each other in outer peripheral length, the unit turn portion of small inner peripheral length being formed by winding the conductor around the wiring core of small outer peripheral length of the jig, the unit turn portion of great inner peripheral length being formed by winding the conductor around the wiring core of great outer peripheral length of the jig.